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ABSTRACT

Just as urban ecologists have shown that social behavior such as delinquency is related to spatial patterns, educational achievement should logically be related to socio-spatial patterns. Accordingly, the hypothesis of the present study is that school neighborhoods can be ecologically grouped so as to enhance the prediction of achievement. The elementary schools of three large public school districts in the Kansas City Metropolitan Area constitute the population in this study. The unit of analysis used in this study is the individual elementary school as outlined by its attendance area. Two working hypotheses were formulated: (1) school neighborhoods can be grouped into meaningful homogeneous types; and (2) including neighborhood type will significantly improve prediction of academic achievement over and above socioeconomic variables which are known to account for a substantial proportion of the variation in achievement among students in the public schools. Fifteen typologies of neighborhoods were produced by manipulating various combinations of factor and cluster analyses. It was found that neighborhood type as delineated by several typological approaches did significantly improve the prediction of academic achievement over and above variance attributable to the best socioeconomic predictors. (Author/JM)

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IDENTIFICATION OF NEIGHBORHOOD TYPE AND ITS UTILITY IN PREDICTION OF ACHIEVEMENT

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IDENTIFICATION OF NEIGHBORHOOD TYPE AND ITS UTILITY IN PREDICTION OF ACHIEVEMENT

Jeanie K. Meyer and Daniel U. Levine

During the past fifty years, urban ecologists have documented the spatial distribution of social phenomena and behavioral correlates such as crime, delinquency, and illness (Reckless, 1926; Shaw, 1929; Faris & Dunham, 1939; Shevky & Williams, 1949; Rees, 1970).

Concurrent with these developments, educational sociologists have examined the relationships of socioeconomic and ethnic status to school achievement (Spady 1973 and Averch, et al., 1972).

Curiously, cross-fertilization between these two fields is only just beginning to take place. A number of studies of educational achievement may be termed "ecological" in the sense that they study the distribution of educational phenomena by geographic regions or neighborhoods, i.e. urban versus rural, middle-class versus inner city (Worthington and Grant, 1971; Mayeske, 1969; Byrne, Williamson & Fletcher, 1973; Hogan, 1970). However, only Walberg and Bargen have drawn specifically for this purpose upon the spatial models of city development posited by Park, Burgess and other urban sociologists (Walberg & Bargen, 1974: 357-74). Just as urban ecologists have shown that social behavior such as delinquency is related to spatial patterns, educational achievement should logically be related to socio-spatial patterns. Accordingly, the hypothesis of the present study is that school neighborhoods can be ecologically grouped so as to enhance the prediction of achievement.

Data Sources

The elementary schools of three large public school districts in the Kansas City Metropolitan Area constitute the population in this study. The three districts are: 1) the Kansas City, Missouri School District which is an essentially "central city" district with seventy-nine elementary schools; 2) the Kansas City, Kansas public school district which is an essentially "central city" district with forty-eight elementary schools; and 3) the Shawnee Mission, Kansas public school district which may be characterized as an essentially "suburban" district with fifty elementary schools.

The unit of analysis used in this study is the individual elementary school as outlined by its attendance area. By transferring Kansas City, Missouri, Kansas City, Kansas, and Shawnee Mission, Kansas elementary school boundaries onto a 1970 census block map, it was possible to arrive at a definition of each school in terms of its constituent census blocks. Only blocks which visual inspection indicated were at least fifty percent within a given school's attendance area were included in the list of blocks for that school. Using these lists, information on blocks was extracted from the Third Count of the 1970 Census.

The elementary school attendance area, as operationalized and described by the procedure above, is defined as a neighborhood for the purposes of this study. Although the term "neighborhood" is beset by varied and inconsistent definitions, there are at least some commonly accepted characteristics which offer justification for the use of the elementary school attendance area boundaries. For example, Greer says that neighborhoods are residential areas where locals share common interests in certain things, e.g. schools which are "frequently available only through . . . residence in a geographically delimited aggregate" (Greer, 1972: 116). Thus the elementary school attendance area seems a reasonable proxy for neighborhood when the neighborhood school is commonly attended by most of the students living there. The neighborhood school approach is sufficiently widespread in the Kansas City metropolitan area to expect that there is a large amount of homogeneity of social characteristics within school boundaries. In sum, the elementary school attendance area comes as close as anything to "local areas that have physical boundaries, social networks, concentrated use of area facilities, and special emotional and symbolic connotations for the inhabitants" (Ittelson, 1973: 81).

Independent Variables

Data were extracted, by hand, for 20 census variables from the paper copy report of third count statistics. Most variables used were percentages based on the total number of persons, houses, etc. (depending on the variable) in the school attendance area.

Table 1 gives the means and standard deviations of the twenty census variables for the total sample of school neighborhoods.

TABLE 1

MEANS AND STANDARD DEVIATION OF TWENTY-FIVE SOCIOECONOMIC VARIABLES FOR ONE HUNDRED AND SEVENTY-THREE SCHOOL NEIGHBORHOODS

	Variable	Means	Standard Deviation
1.	Negro as Percent of Total Population	21.7926	33.3994
2.	Percent of Total Population in Group Quarters	2.5173	9.5033
3.	Percent of Total Population Under 18 Years Old	34.4654	11.2029
4.	Percent of Total Population 62 Years and Older	14.1105	10.5409
5.	Percent Year-round Housing Lacking Some or All Plumbing Facilities	2.9809	3.5855
6.	Percent of Year-round Housing Units in One-Unit Structures	86.6216	29.7796

Table 1 (continued)

	Variable	Means	Standard Deviation
7.	Percent of Year-round Housing Units in Structures of 10 or more Units	4.9721	10.6636
8.	Percent of Owner-occupied Housing Units Lacking Some or All Plumbing Facilities	1.7777	2.3884
9.	Average No. of Rooms in Owner-occupied Housing Units	6.1544	4.2542
10.	Average Value($) of Owner-occupied Housing	15504.4531	8271.1758
11.	Negroes as Percent of Owner-occupied Housing	18.0893	31.5977
12.	Renter-occupied Housing Lacking Some or All Plumbing Facilities	3.7598	4.9636
13.	Average No. of Rooms in Renter-occupied Housing Units	4.5201	1.4925
14.	Average Contract Rent($) of Renter-occupied Housing Units	104.5661	48.6526
15.	Negroes as Percent of Renter-occupied Housing	17.4962	30.0251
16.	Percent Occupied Housing Units with 1.01 or more Persons per Room	6.1380	3.7577
17.	Percent Occupied Housing Units with 1.01 or more Persons Per Room With All Facilities	5.7650	3.6112
18.	Percent One Person Households	6.7008	5.9250
19.	Percent with Female Heads of Family	3.0535	1.8281
20.	Percent Occupied Housing Units with Roomers, Boarders, or Lodgers	0.6707	0.5935
*21.	Percent of Total with Females Divorced	6.0488	6.2863
*22.	Percent of All Households Lacking Some or All Plumbing Facilities	1.2460	2.9524
*23.	Percent of Population Aged 10-20 Years Old	20.0017	4.1442
*24.	Percent of Population Aged 14-20 Years Old	12.2501	4.9580
*25	Percent of Housing Units with 6 or More Persons Per Unit	9.6555	4.8363

In addition five variables not reported on paper copy were extracted from census computer tapes at the Demographic Data Center, Technical Services Division, at the Columbia campus of the University of Missouri. These five variables are shown with an asterisk on Table 1.

The census variables used in this study differ somewhat from those used by the majority of social area analysts (e.g. Shevky-Bell, 1955) in that they are drawn from block rather than tract statistics. As described above, block statistics were used because their aggregation into school attendance area boundaries could be more accurately accomplished. Inspection suggests that at least some block variables may be proxy variables for the more commonly used tract variables underlying the hypothesized fundamental dimensions of social area analysts. A comparison between block variables used in this study and frequently-used tract variables and their possible reduction into constructs is depicted in Table 2.

TABLE 2

COMPARISON OF CENSUS TRACT VARIABLES AS DEFINED BY SHEVKY-BELL AND THE CENSUS BLOCK VARIABLES USED IN THIS STUDY

Census Tract Variables Shevky-Bell	Census Block Variables
Social Rank	
Years of schooling Employment status Class of worker Major occupational group Heating & refrigeration	
Value of Home	Avg. value -- owner occupied housing unit
Rent by dwelling unit	Avg. contract rent -- renter-occupied housing units
Plumbing and repair	Owner occupied housing; Renter occupied housing } Percent families lacking some or all plumbing
Urbanization	
Persons per room	1.01 persons per room
Age	Under 18 years 62 years and over Persons 10-20 years old Persons 14-20 years old
Sex	Females, divorced or separated Female headed households
Owners	Total owner occupied housing

Table 2 (continued

Census Tract Variables Shevky-Bell	Census Block Variables
Urbanization (continued)	
Tenants	Total renter occupied housing
House structure	One-unit structure Structures of 10 or more units Avg. no. rooms Units with 6 or more persons Households with roomers, boarders, lodgers in group quarters
Segregation	
Race and nativity	Negro total Negro owner-occupied units Negro renter-occupied units
Country of birth	
Citizenship	

As shown in Table 2, some measures of the basic dimensions of social area analysis are included as independent variables in this study. In addition, an effort has been made to include variables which empirical investigation has suggested are predictive of education criterion variables (Guthrie, 1970: 25-54), in line with our goal of improving the prediction of achievement in neighborhood schools.

Dependent Variable

This study will be restricted to examining cognitive development as reflected in scores on standardized achievement tests. Unfortunately, the three districts in this sample use different standardized tests (two used the Iowa Test of Basic Skills and one used the Stanford Achievement Test), but the comparison of achievement across school districts using different tests is not without precedent. In an examination of inter-city performance of schools, James S. Coleman and others have concluded that while there are statistical problems inherent in trying to draw iron-clad inferences from such comparisons, they are still useful and may make it possible to draw conclusions which cannot be obtained otherwise (Coleman, 1974: 21). The use of results from different tests is further supported by a recent study of the Educational Testing Service. While the results, so far, are only reported for grades four, five and six, examination comparing the Standford Achievement Test (SAT) and the Iowa Test of Basic Skills (ITBS) with the Anchor Test Study percentile ranks suggested that the two tests are not widely divergent (Loret et al., 1974).

Thus supported by considerable precedent as well as empirical comparison of the two reading tests, this study used the third grade median grade-equivalent scores for reading as taken from the ITBS for the Kansas City, Missouri and Shawnee Mission, Kansas school subsamples and the SAT for the Kansas City, Kansas school subsample. The median grade equivalent score for each school was the test datum used here. This procedure is in accordance with that used by Klitgaard who says, "The school's average achievement score is a good proxy for the general level of absolute cognitive performance among its students" (Klitgaard, 1974: 20). Coleman et al. also suggests the appropriateness of the use of grade equivalence scores for cross district comparisons (Coleman, 1974: 155).

Construction of Typologies

The central hypothesis of this study is that knowledge of a school's neighborhood type can add significantly to the amount of achievement variance explained by socioeconomic variables above. The operational testing of this entails two stages. First, a typology of school neighborhoods is structured by configurations of independent variables. Once each school is assigned to a category within a neighborhood typology, regression analysis is performed to determine if the addition of a neighborhood type can account for additional variance in average achievement scores after the best combination of census variables is entered.

A literature review of ecological typology studies indicates that a variety of factor and/or cluster analysis procedures have been used, but there has been little attempt to evaluate alternative typology methods. The ultimate criterion for the evaluation of a typology method in this study was its performance, i.e. whether the typology makes a significant increase to the amount of achievement variance already explained by a benchmark set of predicting variables. The task of selecting promising techniques from among the multitude corresponding to various types of typologies was guided by a number of empirical and theoretical considerations, and tempered by pragmatic realities of time and resources. Three typology approaches were selected for comparison and variant techniques of these three methods resulted in 15 different typologies. For the sake of brevity the three approaches will be summarily described.

1. R-Factor Analysis

Philip Rees has described a commonly used procedure based on R-Factor analysis (1970). The steps, modified for application to the present ecological analysis of neighborhoods, were as follows:

1. From an original matrix of variables and neighborhoods, a matrix of the correlations between variables was calculated.

2. Factors were extracted from the matrix of correlation coefficients in order to summarize the common patterns of variation among the original variables and the factors.

3. These factors were rotated in order to most distinctively allocate variables to factors.

4. Factor scores were computed so as to assign each case a value that gives it a position on scales defined by the particular factors (Lankford, 1969: 196-212).

Several simple procedures which make use of factor scores to group neighborhoods were used. The procedures are:

1. The assignment of neighborhoods into groups on the basis of the range of factor scores on a single factor dimension (Rees, 1970).

2. The assignment of neighborhoods into groups on the basis of the range of factor scores on two to five factors. Assignments with these alternatives was made through visual inspection of each neighborhood's profile on the set of factors as portrayed in terms of high half vs. low half scores (dyads) or high third-middle third - or low third scores (tertiles) on each factor.

2. Hierarchical Clustering Typologies

The variables and the factor scores generated from the principal equimax factors described above also were used as input for hierarchical cluster grouping. This procedure, developed by Ward and Hook (1963: 69-81), makes no assumptions about the number of types of school neighborhoods in the sample, but instead begins by considering each of the N profiles as a group of size one, and concludes with the N profiles in one group. At each stage, all possible pairs of school neighborhoods are considered and the two most similar are combined, thus reducing the total number of school neighborhoods by one while minimizing the increment in total within-group error. Advantages of this clustering method are numerous: its usage is wide-spread; software programs of its algorithm are readily available (the BMD-P programs were used here); any measure of similarity may be used to describe neighborhoods; there is no need to specify in advance the number of groups to be formed or to set arbitrary limits for use in adding profiles to groups; and the technique shows the order in which neighborhoods are grouped so the analyst can judge the appropriateness of different stages of classification.

3. BC TRY Key Cluster Factoring and O-Type Analysis

Tryon and Bailey's key-cluster factoring and O-type analysis may be thought of as a combination of factor analysis and cluster analysis. This procedure has the capacity to delineate both the general dimensions of objects (key cluster factoring, somewhat similar to factor analysis) and the general types into which the objects can be classed (O-analysis, somewhat similar to hierarchical cluster analysis).

Tryon describes the logic of the general method of key cluster factoring as follows:

> Starting with the matrix of correlations of the variables, with the communalities in the principle diagonal cells, the first dimension, or factor, is defined as a weighted composite of the variables. This composite is taken to be either a subset of them or the total set of them with a designated pattern of weights attached to the variables. Then, by a special form of adjustments, scores on this first factor composite are partialed out of each of the correlations in the matrix. The resulting matrix is called the 'first factor residual matrix.' A second dimension is then defined by a newly weighted composite of the variable scores on which are partialed out the first residual matrix, the result of which forms a second residual matrix. The procedure is continued until a final residual matrix is formed of entries that are of trivial magnitudes (Tryon and Bailey, 1970).

According to Tryon and Bailey, preset key-cluster factoring has an advantage over the orthodox forms of factoring by the principal axes and centroid solutions. "Being able to preset the definers of key clusters makes it possible to define dimensions by any subset of variables. The analyst has complete command over the factoring process in key cluster factoring" (1970: 86).

In O-analysis neighborhoods are typed together on the basis of the dimensions derived from the key cluster analysis. Bailey says that a central reason for doing so is to secure the gain in generality that such dimensions necessarily possess when individual variables are used to group neighborhoods. "A greater degree of generality in typological prediction can be expected where a typology is based on cluster-composited dimensions" (1970: 140). This proposition will be tested by comparison of prediction with other methods discussed above.

Summary of Typologies

The fifteen variations of these three typological approaches (described above) are listed in Table 3. As this list indicates, the variations within approaches reflect the number of factors used and/or the number of ranks within factors which are used. In a few cases the racial composition of the school neighborhood is a consideration in the grouping procedure.

TABLE 3

TYPOLOGY METHODS USED IN THIS STUDY

R-Factor Score Visual Grouping	-	1 - 5 Factor Profile - Dyads 2 - 4 Factor Profile - Dyads 3 - Principal Component Ranks 4 - 2 Factor Dyad Profile by 3 Levels of Racial Integration
Hierarchical Clusters	-	5 - 25 Variables 6 - 5 Factor Scores 7 - 5 Factor Score Tertiles 8 - 5 Factor Score Dyads 9 - 2 Factor Scores, highest correlation with criterion in white schools. 10 - 2 Factor Scores, highest correlation with criterion in black schools. 11 - 3 Factor Scores, highest correlation with criterion variable in white schools, race excluded. 12 - 3 Factor Scores, highest correlation with criterion variable in black schools, race excluded.
BC TRY Clusters	-	13 - O-type Profiles - Dyads 14 - O-type Profiles - Triads 15 - O-type Profiles - Quartiles

Analysis

Having developed a number of neighborhood typologies, the next step was to test each of these typologies within a "benchmark" regression equation for the dependent variable, reading level. Four socioeconomic variables (including one curvilinear term) were found to account for 65 percent of the variance in 3rd grade reading level for the sample of three school districts. The predictor variables in this benchmark equation with their means and standard deviations are shown in Table 4.

TABLE 4

MEANS AND STANDARD DEVIATIONS OF BENCHMARK SOCIOECONOMIC VARIABLES AND MEDIAN THIRD GRADE READING LEVEL FOR THREE SCHOOL DISTRICTS (N = 173)

Variables	Means	Standard Deviations
1. Percent of Owner-occupied Housing Units Lacking Some or All Plumbing Facilities	1.7777	2.3884
2. Average Value($) of Owner-occupied Housing Units	15504.4531	8271.1758
3. Average Contract Rent($) of Renter-occupied Housing Units	104.5661	48.6526
4. Percent Occupied Housing Units with 1.01 or more Persons per Room	6 1380	3.7577
5. Owner Value (log)	9.5726	.4560
6. 3rd Grade Median Reading Level	3.1090	.7565

In order to assess whether neighborhood type adds to the predictive power of the four benchmark socioeconomic variables, the neighborhood type is reduced to a category by creation of a dummy variable and is added to the benchmark regression equation (Hu, 1973: 67). The R^2 calculated with only the benchmark predictors is then compared with the R^2 produced by the benchmark socioeconomic measures plus neighborhood type (See Kerlinger & Pedhazur for the procedure for testing the significance of R^2 change, 1973: 233-239). Table 5 gives the results of calculating R^2's for the restricted model (the four benchmark variables)and for the full model (the four benchmark variables plus neighborhood type).

As Table 4 shows, the R^2 for the full model is significantly greater than the R^2 for the restricted model when neighborhood type was defined by typology methods: 1) Visual--Five Factor Dyad Profiles; 4) Visual--Two Factor Dyad Profile by 3 Levels of Racial Integration; 13) BC TRY Cluster Dyads; and 14) BC TRY Cluster Tertiles. Since neighborhood type as derived from four different methods accounts for a statistically significant amount of variance added in predicting reading level after benchmark socioeconomic variables are entered first, it can be concluded that neighborhood type and socioeconomic measures each have independent relationships with reading level. In other words, this study's central hypothesis that neighborhood type would significantly increase the amount of variance explained is confirmed.

TABLE 5

SQUARED MULTIPLE CORRELATIONS (R^2) FOR THE ADDITION OF SCHOOL NEIGHBORHOOD TYPE (AS DERIVED BY FIFTEEN METHODS) TO THE BENCHMARK SET OF LINEAR AND CURVILINEAR SOCIOECONOMIC VARIABLES RELATED TO ACHIEVEMENT

	Typology Method No.[1]	With School Neighborhood Type - R^2	R^2 Change F
Dependent Variable = Median Third Grade Reading Level			
Socio-Economic Variables:			
1. Owner Value - log	1	.716	1.97*
2. Renter Value	2	.699	1.45
3. 1+ Per Room R^2 = .647	3	.679	1.56
4. Owners Lacking Plumbing	4	.725	7.32**
	5	.670	.77
	6	.686	1.11
	7	.662	.871
	8	.679	1.56
	9	.670	1.07
	10	.670	1.21
	11	.665	1.07
	12	.678	.81
	13	.684	3.17**
	14	.685	2.21*
	15	.689	1.72

[1]Typology method no. refers to the following: 1) Visual -- Five Factor Dyad Profile; 2) Visual--Four Factor Dyad Profile; 3) Visual--Principal Component Scores; 4) Visual--Two Factor Profile by 3 Levels of Racial Integration; 5) Hierarchical--Twenty-five Variables; 6) Hierarchical--Five Factor Scores; 7) Hierarchical--Five Factor Score Tertiles; 8) Hierarchical--Five Factor Scores Dyads; 9) Hierarchical--Two Factor Scores Correlating Highest with Achievement in White Schools; 10) Hierarchical--Two-Factor Scores Correlating Highest with Achievement in Black Schools; 11) Hierarchical Three-Factor Scores Correlating Highest with Achievement in White Schools (Race Excluded); 12) Hierarchical Three-Factor Scores Correlating Highest with Achievement in Black Schools (Race Excluded); 13) BC TRY Cluster Profiles Dyads; 14) BC TRY Cluster Tertiles; 15) BC TRY Cluster Profile Quartile.

*Significant at .05 level.

**Significant at .01 level.

Having identified four neighborhood typologies which were useful in significantly improving prediction, it is appropriate to describe each procedure in greater detail. They are:

1. Visual - Five Factor Dyad Profile

All factor scores were transformed by use of the SAS ranking program into dyad ranks of 1 for high actor scores and 0 for low factor scores (e.g. 11111; 11110; 11100. . . .00011; 00000). Each neighborhood school profile was then grouped with similar profiles. Most neighborhoods shared a common profile on at least the first three factors and sometimes on the first four. This approach produced eleven groups.

2. Visual--Two Factor Dyad Profile by 3 Levels of Racial Integration

This typology was constructed by first subdividing the sample of schools into three groups by degree of racial integration. These three are: two or less percent black, between three and sixty-two percent black and greater than sixty-two percent black. Separate equimax factors were derived for each of these three subgroups and the resulting factor scores were divided into high and low on each factor. Schools within subgroups with similar profiles on factors formed a neighborhood type. This approach produced nine groups.

3. BC TRY Cluster Dyads

This technique created three categories for each cluster by dividing scores into high (above sixty), medium (between forty and sixty), and low (below forty). The results of this 0-type profile division produced nine groups.

4. BC TRY Cluster Tertiles

In this technique two categories were created by dividing scores into high (above the mean of fifty) and low (below the mean of fifty). This produced seven groups.

Testing of Typology Methods with Additional Achievement Measures

In order to test the reliability of the neighborhood typologies, three of the four effective typology methods (one of the BC TRY methods was dropped because it appeared so similar to the other) were tested with alternate dependent measures of achievement. Six measures of 6th grade reading achievement levels were available for one of the three original districts. These measures were: 1) Sixth grade reading, 50th percentile, 1970-71; 2) Sixth grade reading, 75th percentile, 1970-71; 3) sixth grade reading, 50th percentile, 1971-72; 4) sixth grade reading, 75th percentile, 1971-72; 5) sixth grade reading, 50th percentile, 1972-73; and 6) sixth grade reading, 75th percentile, 1972-73.

Table 6 reports the means and standard deviations for each of the dependent and independent variables for this subsample.

TABLE 6

MEANS AND STANDARD DEVIATIONS OF 6TH GRADE READING LEVEL VARIABLES (N = 64)

	Mean	Standard Deviation
1. 6th grade reading 50% - 1970-71	5.6	.84
2. 6th grade reading 75% - 1970-71	6.6	.91
3. 6th grade reading 50% - 1971-72	5.6	.73
4. 6th grade reading 75% - 1971-72	6.5	.80
5. 6th grade reading 50% - 1972-73	5.7	.80
6. 6th grade reading 75% - 1972-73	6.7	.86

Table 7 reports the R^2 increases produced by the three best neighborhood typology methods. As shown in Table 7, two of the three typologies (4 and 14) contribute significantly in improving the prediction of achievement for at least half of the additional dependent variables when entered after the best census predictors. Type 4, which significantly improves the prediction in four of the six cases, is the most consistently potent typology in improving the prediction of achievement. This typology (see p. 12 above) is the only one used in this study in which predominantly white and black neighborhoods were separated before introduction of the factoring and clustering procedures described in the first part of the paper. This finding suggests that it might be desirable to study the internal dynamics of white and black neighborhoods separately (in the sense indicated above) in future studies of big city neighborhoods. It also suggests that the two-factor visual dyad approach is particularly worthy of inclusion in future studies examining the utility of neighborhood typologies in predicting and explaining the ecology of urban social phenomena such as school achievement and delinquency.

TABLE 7

SQUARED MULTIPLE CORRELATIONS (R^2) FOR THE ADDITION OF SCHOOL NEIGHBORHOOD TYPE TO THE BENCHMARK SOCIOECONOMIC VARIABLES RELATED TO ACHIEVEMENT

Dependent Variables+	Socioeconomic Variables	Socioeconomic Variables R^2	With Type 1 Added R^2	Type 1 R^2 Changes F	With Type 4 Added R^2	Type 4 R^2 Changes F	With Type 14 Added R^2	Type 14 R^2 Changes F
1. R6507071	Percent Negro renters - log Owner Value	.67	.73	3.36**	.68	1.62	.63	.25
2. R6757071	Percent Negro renters - log Owner Value	.62	.70	1.54	.64	.98	.62	.74
3. R6507172	Percent Negro renters - log Owner Value Owner Lacking Plumbing	.69	.75	1.86	.74	2.28*	.70	2.20*
4. R6757172	Percent Negro renters - log Owner Value	.65	.72	1.86	.70	2.50**	.66	1.02
5. R6507273	Percent Negro renters - log Owner Value	.65	.73	1.63	.70	2.25*	.70	4.33**
6. R6757273	Percent Negro renters - log Owner Value 1.01 or more per room (1.01 or more per room) X (Owner Value)	.76	.85	5.75**	.81	3.98**	.78	2.77**

*Significant at .05 level.
**Significant at .01 level.
+Dependent variable names are: 1. R6507071 = 1970-71 6th grade reading - 50%; 2. R6757071 = 1970-71 6th grade reading - 75%; 3. R6507172 = 1971-72 6th grade reading - 50%; 4. R6757172 = 1971-72 6th grade reading - 75%; 5. R6507273 = 1972-73 6th grade reading - 50%; 6. R6757273 = 1972-73 6th grade reading - 75%.

Summary and Conclusion

A review of the literature on urban ecology suggested the importance of considering "social areas" or neighborhood in explaining the distribution of various manifestations of social problems. But while methodologies for delineating neighborhood typologies have been available, systematic attempts have not been made to predict or explain academic achievement with reference to neighborhood types or to compare the utility of various typologies in accounting for achievement differences. With this in mind, two working hypotheses were formulated: 1) school neighborhoods can be grouped into meaningful homogeneous types; and 2) including neighborhood type will significantly improve prediction of academic achievement over and above socioeconomic variables which are known to account for a substantial proportion of the variation in achievement among students in the public schools.

Fifteen typologies of neighborhoods were produced by manipulating various combinations of factor and cluster analyses. It was found that neighborhood type as delineated by several typological approaches did significantly improve the prediction of academic achievement over and above variance attributable to the best socioeconomic predictors.

The results of this study constitute an extension of classical ecological thought inasmuch as they deal with the distribution of school achievement levels within an urban area. Ecological analysis has been shown to be useful in accounting for differential achievement levels among schools, just as it previously has been shown to be useful in accounting for differentials in delinquency, crime, mental health, and other important social phenomena in urban communities.

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